NEW HAMPSHIRE DEPARTMENT OF Environmental Services

Nonpoint Source Management Annual Report

2002

December 2003

NHDES-R-WD-03-43

Nonpoint Source Management Annual Report

2002

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Cover Photo: Lamprey River, NH DES

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Introduction

This report provides an overview of federal fiscal year 2002 (October 1, 2001 - September 30, 2002) activities funded under the Clean Water Act Section 319 program and other activities within the New Hampshire Department of Environmental Services (DES) that addressed nonpoint source pollution. The 1999 *New Hampshire Nonpoint Source Management Plan* serves as the guidance document for conducting these activities. The report begins by describing broad state-wide initiatives, and then covers activities within the five major New Hampshire watersheds.

Nonpoint Source and Related Program Initiatives

There's no such thing as a junkyard

Junkyards are listed as the fourth highest priority nonpoint source issue in the New Hampshire *Nonpoint Source Management Plan*, following urban runoff, habitat modification, and subsurface systems. While the other issues were being addressed through various Watershed Assistance Programs during the past five years, there was little activity dealing with junkyards. Inappropriate management of scrap vehicles, particularly the fluids contained within them, can result in groundwater or soil contamination and expensive clean-ups. In FY 2002, DES initiated two major projects to address water quality problems associated with junkyards.

A motor vehicle crushing pad, recently installed as part of a NH Auto & Truck Recyclers Associations' 319 project, is designed to keep fluids off the ground and available for recovery and safe disposal.

In advance of a planned regulatory program dealing with junkyards, or motor vehicle recycling yards, the DES Waste Management Division, with Section 319 funding support, kicked off the *N. H. Green Yards* program. The program will include a series of workshops and the distribution of laminated BMP guide sheets designed for quick reference and ease of use by salvage yard operators. This education and outreach will be followed by environmental self-audits and compliance certification. Yards that are unable to certify compliance with minimum standards will be required to submit a plan for compliance. The second project is a 319 grant awarded to the N. H. Auto and Truck Recyclers Association to demonstrate BMPs for containing spilled automotive fluids at seven motor vehicle recycling yards.

Education and Outreach

In 2002, outreach efforts continued to promote and highlight Section 319 grant programs and provide nonpoint source pollution education and resources to individuals, communities, and watershed organizations.

Ongoing initiatives included the continued distribution of the biannual *NPS Newsletter* with articles on several grant projects and an increased mailing list from 340 in 2001 to 580 in 2002. The publication and distribution of *GreenWorks*, the monthly newspaper column addressing water quality and the environment was also continued with new articles relating water quality to all aspects of the environment and how New Hampshire residents can make a positive difference. Publications are available at www.des.state.nh.us/wmb/was/npspubs.htm

New initiatives included the creation and promotion of a new display highlighting the Section 319 grant program and several grant success stories. Designed for several audiences, the display was taken to many events including the New Hampshire Farm and Forest Expo, the New Hampshire Coastal Forum, and the Exeter River Alewife Festival.

To mark the 30th anniversary of the enactment of the federal Clean Water Act, congress proclaimed 2002 as the national "Year of Clean Water." In recognition of this legislation, and to utilize some national resources and press associated with this event, the Watershed Assistance Section took the lead at DES to coordinate and promote activities in New Hampshire. Celebrations included the signing of a 2002 Year of Clean Water proclamation by Governor Shaheen, several water related events, a Year of Clean Water display, and student participation in a national water quality competition.

To assist watershed organizations in their outreach efforts, a new grant program was created, utilizing Section 319 funds, to provide small grants up to $2,000 for outreach and education projects that address NPS water quality and/or quantity issues. Highlights of 2002 projects include supporting: the Androscoggin River Source to the Sea Canoe Trek, outreach to riverfront landowners in the Exeter River watershed, the Pemigewasset River corridor education and outreach program, and the Crystal Lake water quality testing and monitoring program.

Outreach assistance was also provided to watershed organizations through a comprehensive one day workshop, “Innovative Outreach Topics for Volunteer Organizations”, held in the March, 2002. Seventy-five people from various state, federal and local watershed organizations benefited from this training. The workshop and the new grant program have proven to be the catalyst to more comprehensive work with assisting local organizations in planning their outreach through facilitation using EPA’s *Getting in Step* outreach guide.

River Restoration through Dam Removals

Section 319 funds have assisted in the restoration of rivers via the Department's new Dam Removal Program. During the summer of 2001, the McGoldrick Dam in Hinsdale became the first dam to be removed in New Hampshire. The removal of this dam is part of a larger plan to restore the movement of anadromous fish, including American shad, blueback herrings and Atlantic salmon, to the Ashuelot River – a historically significant tributary to the Connecticut River. In FY 2002, an additional 15 miles of the river were returned to a free flowing condition after the removal of the Winchester Dam.

Removal of the Winchester Dam July 25, 2002.

Former Site of the Winchester Dam, Ashuelot River.

When a dam becomes obsolete, it can become a safety hazard. The removal of these dams can restore fisheries, improve water quality and create new recreational opportunities. Under the auspices of the New Hampshire River Restoration Task Force, which includes representatives of local, state, and federal agencies and non-governmental organizations and is lead by DES, several additional projects are currently in the planning and permitting process. See www.des.state.nh.us/dam/DamRemoval for more information.

Smart Growth

DES contributed to several significant smart growth projects in FY '02, including the development of new guidance, a community-based pilot project on evaluating local ordinances, and successful education and technical assistance efforts in the coastal watershed. These projects helped motivate communities to identify and protect important undeveloped lands and to examine their local ordinances to better manage growth.

DES worked with EPA Region I, the Office of State Planning (OSP), the Department of Transportation, and several Regional Planning Commissions to produce a new guidance: "Achieving Smart Growth in New Hampshire." This guidance identifies eight smart growth principles for New Hampshire communities and presents examples, primarily from New Hampshire, to illustrate how to implement these principles in practice. OSP

introduced the guidance through seven regional workshops. DES will further publicize and distribute the guidance through several of its programs.

In addition to the new guidance, these same organizations worked with three New Hampshire communities in a pilot project to develop a community-based process for evaluating local ordinances against the goals and priorities of the communities and the eight New Hampshire smart growth principles. DES participated in the design and implementation of this pilot project in the towns of Pembroke, Chester and Derry. Two workshops were held in each community to review local priorities, discuss projections for future growth, and present alternative approaches for accommodating this growth. Each community also received a report that presented the results of the community meetings and provided specific recommendations for ways they could adjust their local ordinances.

Communities face the challenge of balancing growth with land protection.

The positive results of education and outreach were realized for the City of Dover and three communities within the Squamscott watershed (Exeter, Newfields, and Stratham) through the Natural Resource Outreach Coalition (NROC), a coalition of several organizations focused on resource protection in the coastal watershed. In Dover, DES staff contributed to the development and implementation of a focused community education effort by city residents. This effort included a series of workshops, including a workshop coordinated by DES staff on Smart Growth principles and the environmental, social and economic benefits of implementing smart growth practices. As a result of the NROC program, Dover successfully bonded funds for the protection of open space and made several changes to their local ordinances, including the creation of a resource protection area where all new subdivisions are required to use conservation design. For the Squamscott project, DES staff participated in several community meetings to identify and discuss regional growth issues. DES staff also provided a workshop on conducting effective public outreach for the Squamscott project communities. As a result, Exeter developed a marketing campaign to gain support for a bond for open space protection, which was passed overwhelmingly by the community.

For further information on smart growth development in your town, contact Carolyn Russell at (603)271-3010 or crussell@des.state.nh.us.

Quality Assurance

Quality Assurance Project Plans assure the continuity and validity of water quality data.

FY 2002 was a year of significant growth for the quality assurance (QA) program at DES; this was brought about by several new initiatives implemented at the end of FY 2001. DES issued a new Environmental Data Quality Policy in June 2001 and the EPA approved the first DES *Quality Management Plan (QMP)* in August 2001. At this time, a QA Team was formed to implement the QMP. At about the same time, EPA stepped up its commitment to ensure that all EPA-funded projects involving environmental measurement have a Quality Assurance Project Plan (QAPP) in place before data collection begins. QAPPs are required for DES programs as well as outside projects receiving EPA funding.

In order to better comply with the QAPP requirement for 319 funded grant projects, the Watershed Assistance Section established a Program QA Coordinator. She assists grant recipients through the QAPP writing and approval process. Assistance includes providing guidance materials, including a QAPP template developed by DES following EPA protocol and example QAPPs. QAPPs must be approved by DES and the EPA prior to commencement of work. In March, 2002 DES and EPA held a one-day training session on writing QAPPs. This course was developed by EPA for New Hampshire and was well received by DES staff and several 319 grant recipients.

During FY 2002 QAPPs were approved by EPA for the following projects:

- *Boire Field Subwatershed Project*, Nashua Regional Planning Commission.
- *Piscataquog River Riparian Restoration Project*, Piscataquog Watershed Association and St. Anselm College.
- *Stormdrain Investigation for Potential Pollution Sources in Dover, N.H.*, Great Bay Coast Watch and the City of Dover.

During FY 2002 QAPPs were begun on the following projects:

- *Buffer Research, Demonstration, and Education Project*, UNH Cooperative Extension, Grafton County.
- *Littleton Drainage System Mapping and Modeling*, the Town of Littleton.

- *Chocorua Watershed Project, Phase II*, UNH Lay Lakes Monitoring Program.

In order to track the status of projects requiring a QAPP, a QAPP inventory list was created of past, present and upcoming QAPPs for 319 funded projects. The DES QA Manager also created a QAPP inventory list for the entire department. This list is updated and submitted to EPA every quarter. In addition, quarterly round-table meetings for EPA QA staff and QA managers in New England were initiated to discuss regional quality assurance issues.

DES will continually improve the QA program as it develops, including improved communication with current and prospective grant recipients. The Watershed Assistance Section must also complete a QAPP for watershed investigation work.

Highlights and Completed Projects by Watershed

Coastal Watershed

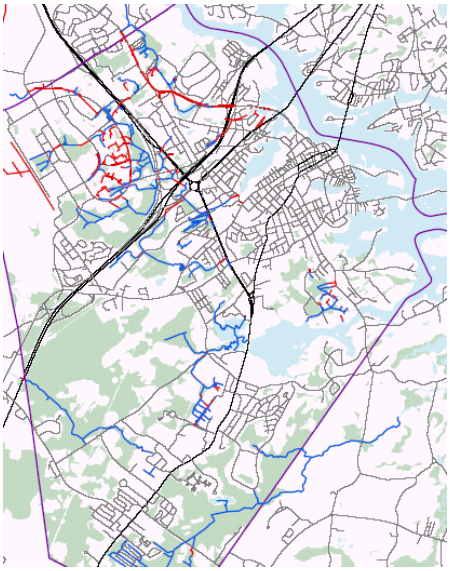
New Hampshire Estuaries Project

In 1995, the estuaries of New Hampshire were designated as national estuaries by EPA and as a result the New Hampshire Estuaries Project (NHEP) was formed to ensure their protection. Since that time, DES staff have worked closely with NHEP staff on a variety of projects. In addition to project collaboration, DES is well represented on the NHEP Management Committee, Water Quality Team, Shellfish Team, and Technical Advisory Committee. The *NHEP Management Plan*, published in 2000, provides the watershed stakeholders with a multitude of actions that address restoration and protection of the Great Bay Estuary, Rye Harbor and Hampton/Seabrook Harbor.

In February 2002, NHEP and DES entered into a Memorandum of Agreement that involved financial assistance from the New Hampshire Office of State Planning. The transfer of funds in the Agreement was intended to assist the NHEP in implementing specific actions in the *NHEP Management Plan*. DES conducted a variety of activities largely focused on improving estuarine water quality and enhancing the use and productivity of shellfish resources. DES staff completed several NHEP action plans by partnering with coastal municipalities and the University of New Hampshire. Highlighted below are two activities that were administered by DES and partially funded through the NHEP.

Storm Drain System Mapping

In FY 2002, DES continued to work with municipalities in the Coastal Watershed on mapping their storm drainage systems. NHEP funds were awarded to the City of Portsmouth and the Town of Seabrook and administered by DES for this purpose.

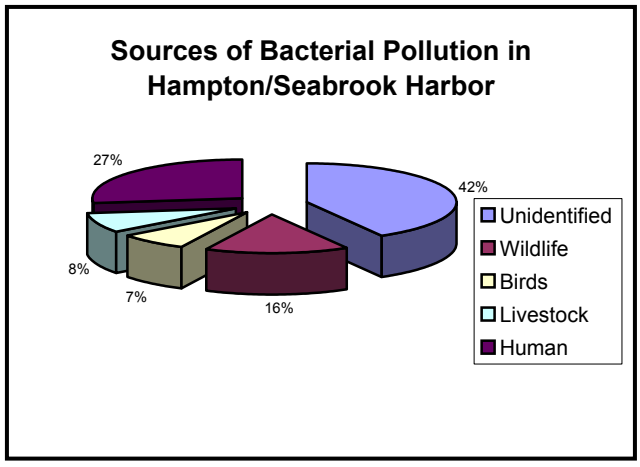


Portsmouth Storm Drain System

Portsmouth entered into an agreement to collect existing drainage information, conduct field investigations of drainage structures, and create elevation and drainage maps. Final storm drainage maps will be incorporated into the City's geographic information system (GIS) and will provide information about drainage areas and the direction of flow for each structure. In addition, this effort will help the City comply with EPA stormwater regulations.

The Town of Seabrook used the grant money to hire a contractor to create digital data layers of drainage features for the town. This effort will also help Seabrook comply with EPA stormwater regulations.

Pollution Source Tracking in Hampton/Seabrook Harbor



During FY 2002, DES and NHEP worked with the University of New Hampshire to identify specific pollution sources using a new technique called microbial source tracking (MST). In jointly funded projects, MST was used to identify the specific sources of bacterial pollution found in Hampton/Seabrook Harbor and the stormwater that flows into the Harbor. The study findings identified the pollution sources (e.g., humans, wildlife, and pets) by matching the DNA in the bacteria found in the water with a DNA library that contains DNA fingerprints for humans, livestock, pets and wild animals. This information will help managers in determining the best methods for eliminating specific pollution sources. In Hampton/Seabrook Harbor, some of the pollution was traced to humans from sources such as leaking sewer pipes. Human fecal-borne pollution poses a serious risk. Virus and harmful bacteria associated with human fecal pollution can cause illness in swimmers

who swallow water, especially young children, and in people who eat raw shellfish. DES and the NHEP will continue to use MST for tracking down pollution sources in the coastal watershed.

Predictive Bacteria Models for Hampton Harbor

Hampton/Seabrook Harbor estuary is the most popular location in coastal New Hampshire for recreational harvesting of softshell clams. However, Closures for recreational clam harvesting because of bacterial pollution are common at the harbor, particularly following rainfall events.

Jeff Deacon of the U.S. Geological Survey collects a water sample in Hampton/Seabrook Harbor

319 Restoration funds were used to partially fund a study by the U.S. Geological Survey, in cooperation with the DES Shellfish Program, to determine the degree to which environmental factors affect bacterial pollution concentrations in the harbor. The ability to predict fecal coliform concentrations based on environmental factors could help the DES Shellfish Program better manage closures of shellfish growing waters. Water samples were collected, along with information on environmental factors, including rainfall, salinity, turbidity, water temperature, wind speed, wind direction, air temperature, and qualitative bird population counts, on a monthly and rainfall-event basis throughout 2000 and 2001. Other factors were also noted, such as population density and whether the area was served by municipal sewer or on-site septic systems.

The study results are summarized as follows:

- Bacteria levels are significantly different among some seasons, specifically between spring and fall. Warmer water temperatures and the increase in population in the summer and portions of the fall, compared to winter and spring, may be one reason for higher fecal coliform concentrations during these seasons.
- In general, samples collected during neap tide cycles (usually the lowest of the low tide heights) had higher bacteria levels than samples collected during spring tide cycles (usually the highest of the high tide heights).

Dilution from a greater volume of ocean water during spring tide cycles may affect the concentrations.

- Fecal coliform data indicate that bacteria increased in the harbor and the tributaries as rainfall amounts increased. Direct surface runoff may be contributing to the increase in bacteria concentrations in the harbor during and after periods of rainfall events.
- Statistical correlations between fecal coliform concentrations and other environmental factors were weak or not statistically significant.

Predicting fecal coliform concentrations based on environmental factors alone is affected by the natural variability in fecal coliforms. The study authors suggest that other factors not included in the study may improve some of the explanation of the variation in fecal coliform concentrations. These factors are the fecal coliform concentrations in wastewater effluent, active boat use, and quantitative data on bird populations. The authors also suggest that a more detailed sampling program on bacteria pollution from stormwater discharges also may define more variability in fecal coliform concentrations.

In response to the last suggestion and for numerous other reasons, DES conducted a wet-weather study of the stormwater discharges in Hampton/Seabrook Harbor. This study showed that there can be significant bacterial pollution loads to the harbor from storm drain outfalls. As a result, DES is working with the watershed communities to clean up the pollution in the stormwater before it flows into the harbor.

The information for this article is based on the report titled, "Assessment of Environmental Factors Affecting Fecal-Coliform Concentrations in Hampton/Seabrook Harbor, New Hampshire, 2000-01." The report was written by Jeffrey Deacon and W. Christopher Nash. Water-Resources Investigations Report 02-4252. It is available from the U.S. Geological Survey in Concord, New Hampshire, (603)226-7837.

Other Completed Projects

Jan Mar Dairy Farm, Rochester, Roof Construction Project (1999)

319 Restoration funds were used to fund the construction of a roof over a newly paved feedlot. This BMP has reduced the flow of contaminated run-off to a nearby stream. This project is the final phase of several BMPs installed at the farm since 1999.

Education and Outreach to Promote Land Protection, Rockingham Planning Commission (2001)

Working with the Exeter River Local Advisory Committee and the Powwow River Watershed Advisory Committee, the following three workshops were held: Discover Vernal Pools, Land Protection and Estate Planning, and Planning for the Protection of Wildlife Habitat. As a result, additional volunteers joined the committees and donations for two conservation easements were received.

Scrutons Dairy Farm, Phase III, Farmington (2000)

Following the work already completed in Phase I and Phase II for this site, Phase III involved continued improvements to the farm through removal of an existing lagoon, construction of a second manure storage facility, and installation of a roof. These BMPs will result in water quality improvements both on and off site.

Heron Point and Sliding Rock Restoration, Newmarket (1999)

Planting native vegetation at Heron Point along the Lamprey.

This project involved erosion control measures at two sites in Newmarket. At the Heron Point site, log terraces were installed and native vegetation planted to reduce by 50 percent soil erosion into the Lamprey River. This project has helped maintain the integrity of a public boardwalk along the river. The second project entailed the paving of an access point and installation of a concrete boat launch at the junction of the Piscassic and Lamprey Rivers. Prior to this, trailors were backed directly down the silty channel bottom causing significant disturbance to the river.

Merrimack River Watershed

The DES began implementing pollution source investigations for the Merrimack watershed in June of 2002. Investigation efforts were modeled after the highly successful illicit discharge detection program implemented in the coastal watershed since 1996. The work in the Merrimack watershed during FY 2002 focused on two specific areas of investigations for bacteria sources: 1) assisting the City of Nashua with compliance for NPDES Phase II requirements to develop and implement a plan to detect and address illicit discharges to the storm drainage system and 2) initiating illicit discharge investigations along the Winnipesaukee and Pemigewasset River corridors. All work was conducted during dry weather, that is not more than 0.10 inches of rainfall in the previous 48 hours. If an outfall was discharging to surface waters and the flow was steady enough to at least partially fill a sample bottle, DES staff collected a sample and had it analyzed for *E.coli* bacteria. The locations of all outfalls (dry and discharging) were determined using a GPS unit and a detailed field sheet was completed for each outfall that documented size, material, and condition of each outfall. Where pollution sources are found, DES staff work with municipalities on remediation, which often requires technical and financial assistance, and in some cases, regulatory compliance and enforcement.

The goal for FY 2002 was to complete investigations along all shorelines within the City of Nashua and to begin preliminary investigations within the Pemigewasset and

Winnipesaukee corridors. Although excellent progress was made, investigations in Nashua will continue into FY 2003 with illicit discharge detection work being turned over to the City of Nashua Department of Public Works. In addition to completing investigations in Nashua next year, staff will continue surveys along the Winnipesaukee and Pemigewasset shorelines and hopefully initiate an illicit discharge detection program within the Souhegan River watershed.

City of Nashua Investigations

DES personnel sampling an outfall during dry weather investigations along the Nashua River.

The majority of illicit discharge detection surveys in the Merrimack watershed during FY 2002 were conducted within the City of Nashua in support of their efforts to comply with NPDES Phase II requirements. Twenty-nine field days were devoted to the investigations for all surface waters within the City of Nashua. To date, 311 outfalls have been identified and documented with 34 of those discharging enough volume to permit *E.coli* sampling and analysis. Approximately 70 miles of shoreline of rivers, streams, brooks and ponds have been investigated in Nashua, which represents 92 percent of the total. The remaining 6.26 miles should be completed in 2003. Although several outfalls require another visit and sample collection to verify potential pollution sources in Nashua, there was one illicit connection that was positively identified during FY 2002. The Nashua DPW officials worked with DES staff to conduct a system-wide investigation of the storm drainage system that includes St. Joseph Hospital and several large residential areas. It was discovered that a toilet and sink within the boiler room of the hospital was connected to the storm drainage system. The bathroom was immediately locked to discontinue usage and plans were made to obtain the necessary approvals and permits from the state and city to correct the problem. Construction should be complete by the spring of 2003.

Investigations Along the Winnipesaukee and Pemigewasset River Corridors

In FY 2002, DES staff spent two field days investigating pollution sources on the Pemigewasset River in the City of Franklin. Six outfalls were documented with two of them flowing enough to collect samples. Neither sample had *E. coli* counts greater than 406 cts/100 mL, which is the state standard for a single sample collected in fishable and swimmable waters. One outfall pipe that was submerged during the initial investigation will be visited again during FY 2003 in an attempt to check for discharge during a low flow period.

An additional six field days were devoted to dry weather investigations within the Winnipesaukee River corridor. Approximately 15 miles of shoreline were investigated

and 155 outfalls were documented with 15 of those outfalls discharging enough to collect samples for *E. coli* analysis. One of the outfalls sampled (WIR-150) had an *E. coli* concentration greater than 2,000 cts/100mL, clearly exceeding the state standard for a single sample. Two subsequent samples collected from WIR-150 had *E. coli* values of 9,100 and 79,000 cts/100mL respectively. This information was delivered to the Franklin Health Officer along with the DPW, and they immediately began dye testing to locate the source of pollution. A residential/commercial building was illegally connected to the storm drainage system and plans are currently underway to correct the situation and connect the building's sanitary wastewater line to the municipal sewer system.

Summary of Dry Weather Bacteria Investigations in the Merrimack Watershed During FY 2002
NH Department of Environmental Services

Town/City	Outfalls documented	Samples collected	Samples with *E. coli* > 406 cts/100mL	Sources identified	Sources under investigation
Nashua	311	34	3	1	1
Franklin	44	7	3	1	1
Tilton	32	3	0	0	0
Laconia	85	7	1	0	1
TOTAL	472	51	7	2	3

Other Completed Projects

Powwow River Watershed Management and Action Plan, Merrimack River Watershed Council (2000)

This $12,000 grant helped the council develop a watershed assessment and action plan for the Powwow River. A shoreline survey was conducted and a list of problems, assets and recommendations for protection and restoration was developed.

Boire Field Brook Subwatershed Project, Nashua Regional Planning Commission (2001)

The goal of this project was to assess the impacts of stormwater runoff on a portion of the Boire Field Brook Subwatershed of the Pennichuck Brook Watershed. The project involved inventorying existing drainage systems, public education, recommending the use of best management practices in any future development plans and suggestions of treatment options at specific sites.

Pennichuck Water Works Technical Transfer to Agricultural Landowners and "Hot Spots" in the Pennichuck Watershed (1999)

The purpose of this project was to inform and educate those businesses and individuals that pose the greatest threat to the groundwater and surface water drinking water supplies in the watershed. Brochures entitled "Are you Polluting your own Drinking Water?"

were developed for agricultural landowners and businesses and for automotive businesses. Fifteen auto repair and dealership facilities were visited along with six landscape, nursery and agriculture businesses. Potential stormwater pollution issues were addressed and educational brochures were distributed.

Dorrs Pond Preservation Society, Water Quality Improvements, Manchester (1997)

Forty-nine thousand dollars was provided to the Dorrs Pond Preservation Society to develop and install best management practices to remove stormwater pollutants entering the pond. After studies revealed that the majority of pollutants were entering the pond at a north end tributary, a water quality treatment device called the "Downstream Defender" was installed at the inlet to the pond. The "Downstream Defender" will capture pollutants before they enter the pond. Follow-up monitoring will occur to measure the success of the device.

Connecticut River Watershed

Lake Sunapee Protective Association Improves the Watershed

With the benefit of 40 years of water quality monitoring data, the Lake Sunapee Protective Association (LSPA) decided in 1995 to implement BMPs in the tributary watersheds with the highest pollutant loads and to focus outreach activities on better land management by property owners and operators. Two projects completed by LSPA during FY 2002 resulted in BMP implementation in five tributary watersheds, outreach to realtors and contractors through workshops and the development of "Water Wise" handbooks, direct contact with hundreds of landowners to address nonpoint source issues, and installation of a shoreland vegetation exhibit and interpretive trail near the LSPA office in Sunapee Harbor. Twenty-one native and naturalized species that do well in shoreland buffer zones are identified with individual plaques with their names, site preferences, and wildlife values. Through LSPAs efforts, the level of knowledge about watershed management among landowners, towns, and business owners is making a difference in Lake Sunapee water quality.

Erosion at Dewey Beach, Sunapee prior to BMPs.

Dewey Beach drainage outlet after BMP installation.

Other Completed Projects

Mid-Upper Connecticut River Water Quality Laboratory, Grafton County Conservation District (1999)

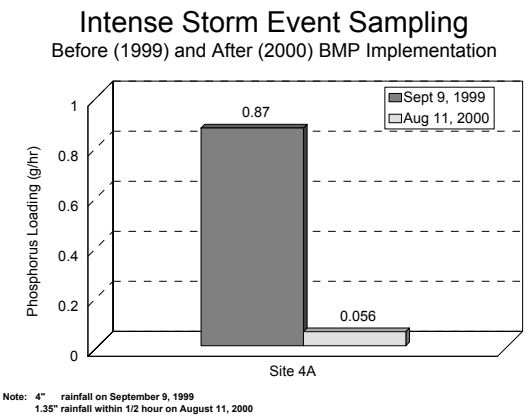
In a joint effort between DES, Grafton County Conservation District, UNH Cooperative Extension and Woodsville High School, 319 funds were used to install a water quality laboratory at the high school. The lab will be used to establish baselines and to monitor water quality changes for tributaries to the upper areas of the Connecticut River. This project was modeled after a similar laboratory that was established at Sunapee High School and was later moved to Colby-Sawyer College, New London.

Saco River Watershed

Curbing Route 16 Runoff at Chocorua Lake

In FY 2002, the Chocorua Lake Association (CLA) completed the first phase of a watershed restoration project begun in 1999 and aimed at reducing phosphorus, which is often carried into the lake along with sediment. Working with a long list of partners, the CLA, the Town of Tamworth, and the N.H. Department of Transportation installed a series of BMPs designed by the Natural Resources Conservation Service along Route 16 and reduced phosphorus loading to the lake by 84 percent. Each BMP has continued to perform to its design specifications, and there is no longer additional sediment accumulation in the lake. Water clarity and in-lake nutrient levels have stabilized. Continued monitoring will provide additional insight into BMP effectiveness and long-term water quality trends of Chocorua Lake.

DOT Commissioner Carol Murray signs historic agreement with the CLA to protect water quality at Chocorua Lake.



To ensure long-term maintenance of the BMPs and to allow for local input on future highway activities, the Chocorua Lake Association and the N.H. Department of Transportation entered into an historic Memorandum of Understanding. Under the terms of the agreement, the DOT will maintain the BMPs, notify the lake association of meetings or projects affecting the highway, and will be sensitive to water

quality issues. In return, the Chocorua Lake Association will monitor the BMPs, provide annual water quality reports to DOT, and provide input to DOT on future decisions regarding the highway.

Other Completed Projects

Piscataquog Watershed Protection Initiative, Piscataquog Watershed Association (1999)

319 funds allowed the Piscataquog Watershed Association to renew its commitment "to conserve the natural and scenic environment of the Piscataquog River watershed and protect the purity of its waters" through organizational development, increasing membership, fund raising efforts, staff training and the development of a volunteer easement stewardship program.

Statewide Efforts

Watershed Steward Program, New Hampshire Lakes Association (NHLA) (1999)

FFY 2002 funding helped to expand the NHLA's Watershed Steward Program, which was piloted for Lake Winnipesaukee, to three additional associations: Beaver Lake Improvement Association, Pawtuckaway Lake Improvement Association and Highland Lake Unified Association. Volunteers with these new sponsors were trained and conducted 37 property assessments. Qualifying properties were certified as watershed stewards. It is hoped that this program will continue to expand throughout the state.

Looking Ahead

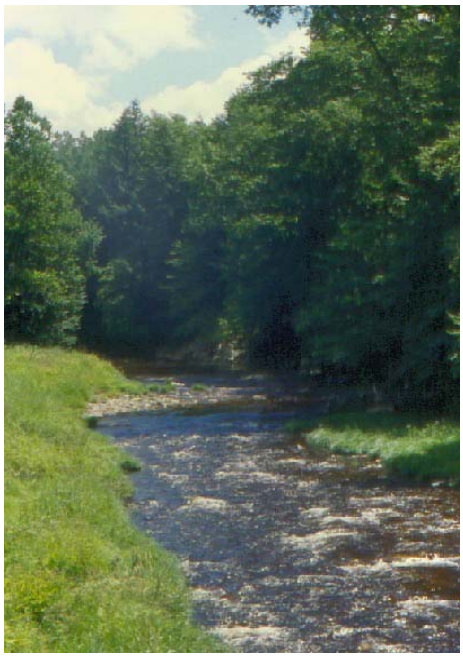
Phase II Stormwater Requirements

By March 10, 2003, many towns and businesses in New Hampshire must meet federal "Phase II" stormwater requirements established by EPA. The Phase II stormwater program regulates 1) certain municipal industrial activities, 2) construction that disturbs one acre or more, and 3) municipal separate storm sewer systems (MS4) within urbanized areas. During FY 2002, DES staff met several times with officials from EPA, N.H. Department of

Federal Phase II Stormwater requirements apply to construction that disturbs one or more acres.

Transportation and the UNH Technology Transfer Center to plan for this upcoming regulation. Several workshops, a new DES website, and other outreach activities are planned for FY 2003.

River Restoration and Natural Channel Design



Every stream and river is seeking to achieve equilibrium.

Hydrologic and habitat modification in New Hampshire surface waters began over 100 years ago to accommodate early settlement, roads, railroads, logging, farms, mills, and other aspects of civilization and the systematic urbanization of the natural landscape. As a result, a significant percentage of New Hampshire rivers and streams have undergone channelization. Typically, channelized rivers and streams are straighter, deeper, narrow, and largely devoid of instream and riparian features that maintain natural channel stability and provide a diversity of aquatic and riparian habitats. It's no surprise then that DES identified hydrologic and habitat modifications as the second highest nonpoint source problem within the *New Hampshire Nonpoint Source Management Plan* in 1999. Support for this ranking is substantiated by the 50 to 75 permit applications received annually by DES for bank stabilization projects, roughly divided between rivers and lakes with some tidal areas as well.

Often times property owners will seek a "quick fix" to erosion problems, without considering the larger geomorphic processes at work. Every stream and river is seeking to achieve equilibrium and an understanding of the mechanics that drive this process can provide the answers for what is causing the problem and ensure that any restoration or stabilization activity will achieve equilibrium with the stream/river dynamics and will not have detrimental effects elsewhere.

DES personnel responsible for permitting, watershed restoration, surface water quality assessments, and river and stream management will be attending professional courses during 2003 that focus upon fluvial geomorphology and natural channel design. This investment in professional development will enable DES personnel to make informed decisions with respect to permit applications, potential restoration project proposals and complaint investigations that involve the fluvial geomorphic process. These decisions will be based on the ability to acknowledge the on-going physical processes and the circumstances that lead to the existence of the impairment. Ultimately, the goal for DES personnel in the coming years will be to have the ability to manage the conflict between people's land use expectations and river dynamics based upon an examination of alternatives and cost-benefit analyses, in both the short and long-term, to both private and

public interests. This type of system-wide analysis as opposed to the traditional site-specific restoration/mitigation approach will integrate well with the new guidelines for the National Nonpoint Source Program (Section 319) and the development and implementation of watershed-based plans.

Discussions with municipalities and local watershed stakeholders on developing project proposals geared toward the creation of fluvial geomorphology-based restoration plans for river and stream corridors that are currently impaired in New Hampshire have already been initiated. Potential project sites slated for development of detailed restoration plans using principles of natural channel design include the Baker River in Warren, Mill Brook in Thornton, the Pemigewasset River in Woodstock, Bog Brook in Stratford and the Swift River in Conway. DES looks forward to receiving restoration project proposals for these sites in November of 2002.

Appendix

Section 319 Projects Completed in FFY 2002

Grantee	Project Name	FFY Source of Funds	Base or Restoration	Grant #	Date Completed	Lead Person
Merrimack River Watershed Council	Powwow River Waterhsed Management and Action Plan	2000	Base	B-00-M-11	11/1/01	Matt Wood
Nashua Regional Planning Commission	Boire Field Brook Subwatershed Project	2001	Base	B-01-M-05	1/24/02	Matt Wood
Rockingham Planning Commission	Public Education and Outreach for Exeter River Local Advisory Comm.	2001	Base	B-01-M-14	4/8/02	Matt Wood
Grafton County Conservation District	Grafton County Conservation District Water Quality Labs	1999	Base	B-99-CT-05	11/30/01	Matt Wood
Lake Sunapee Protective Assn	Beck Brook Runoff Response Program	1999	Base	B-99-CT-09	12/31/01	Matt Wood
Piscataquog Watershed Association	Piscataquag Watershed Association, Land Protection Initiative	1999	Base	B-99-S-16	7/16/02	Matt Wood
Pennichuck Water Works	Pennichuck Water Works Technical Transfer to Watershed Communities Hotspots	1999	Base	B-99-M-15	5/20/02	Matt Wood
Lake Sunapee Protective Assn	Sunapee Watershed NPS Reduction Program	1998	Base	B-98-M-01	12/28/01	Matt Wood
New Hampshire Lakes Assn	Watershed Steward Program Phase Two	1999	Base	B-99-SW-12	12/28/01	Matt Wood
Dorrs Pond Preservation Society	Dorrs Pond Water Quality Improvements	1997	Base	B-97-M-01	2/1/02	Matt Wood
Scrutons Dairy Farm	Scrutons Dairy Farm Water Quality Improvements (Phase III)	2000	Restoration	R-00-C-01	11/15/02	Matt Wood
Carroll County Conservation District	The Chocorua Lake Project, Phase I	1999	Restoration	R-99-S-01	12/3/01	Eric Williams
Town of Newmarket	Heron Point and Sliding Rock Restoration Project	1999	Restoration	R-99-C-02	8/26/02	Natalie Landry
Jan-Mar Farm	Roof Runoff Control Project	1999	Restoration	R-99-C-06	8/2/02	Natalie Landry
N.H. Dept. of Environmental Services	McGoldrick Dam Removal Project	1997/ 2000	Restoration	R-00-CT-09	5/17/02	Stephanie Lindloff
Dept. of Interior, USGS	Predictive Bacteria Model for Hampton Harbor	1999/2000	Restoration	R-99-C-07	9/30/02	Natalie Landry

Section 319 Watershed Restoration Grants Awarded in FFY 2002

Grantee	Project Name	NPS Category	Source of Funds (Fiscal Year)	Grant Award
Coastal Watershed				
Advocates of North Mill Pond	Hodgson Brook Restoration Project	Urban Runoff	2001	$35,500
UNH/JEL	Identification of Pollution Sources and BMP design in the Little Harbor & Atlantic Coast Watershed	General NPS	2000	$41,000
Applehurst Dairy	Applehurst Dairy Farm Stormwater Project	Agriculture	2001	$36,665
City of Portsmouth	Peirce Island Shoreline Stabilization Project	Hydrologic and Habitat Modifications	2001	$7,200
Association of US Delegates to the Gulf of Maine Council	Gulf of Maine Mussel Tissue Survey	General NPS	2000	$1,840
University of New Hampshire	Hodgson Brook Environmental Quality Characterization and Recommended Monitoring	Urban Runoff	2001	$30,802
		Subtotal:		**$153,007**
Merrimack River Watershed				
Town of Meredith	Batchelder Hill Road Drainage Improvements	Road Maintenance	2001	$35,161
Trout Unlimited	Black Brook Topographic Survey and Corridor Restoration Design	Hydrologic and Habitat Modifications	2001	$13,580
Nashua Regional Planning Commission	Mill Pond Restoration Project - Phase II	Urban Runoff	2001	$14,250
Town of Amherst	Baboosic Lake Community Septic System	Subsurface Systems	2001	$10,619
		Subtotal:		**$73,610**
		Award Totals:		**$226,617**

Section 319 NPS Local Initiative Grants Awarded in FFY 2002

Grantee	Project Name	NPS Category	Source of Funds (Fiscal Year)	Grant Award
Granite State Designers and Installers Association	Classroom and On-Site Seminars on Erosion Control Work	Construction/Subsurface Systems	2002	$7,300
Hillsborough County Conservation District	Portable Skidder Bridge Design and Construction	Timber Harvesting	2002	$5,803
Lake Sunapee Protective Association	Sunapee Roadway NPS Reduction Project	Urban Runoff	2002	$3,486
Manchester Water Works	Water Conservation Awareness for Resource Protection of the Massabesic Watershed	General NPS	2002	$20,000
Merrimack County Conservation District	Fencing Project at Morrill's Farm	Agriculture	2002	$24,512
NH Auto & Truck Recyclers' Association	Auto Recycler Fluid Management BMPs	Junk, Salvage and Reclamation Yards	2002	$28,255
NH Dept. of Agricultures	Agricultural Nutrient Management Grant Program	Agriculture	2002	$30,000
NH Dept. of Environmental Services	Motor Vehicle BMP Guide	Junk, Salvage and Reclamation Yards	2002	$38,000
Rockingham Planning Commission	Shoreline Habitat Assessment and Land Protection along the Exeter River	Hydrologic and Habitat Modifications	2002	$9,680
The Garden Club of Dublin	Dublin Lake Shoreline Erosion Control Project	Hydrologic and Habitat Modifications	2002	$18,000
The Green Mountain Conservation Group	Ossipee Watershed Water Quality Monitoring Project	General NPS	2002	$15,000
Town of Littleton	Drainage System Mapping and Modeling	Urban Runoff	2002	$23,640
UNH Cooperative Extension	Development and Implementation of Nutrient Mgt Plans for NH Farms	Agriculture	2002	$78,240
NH Office of State Planning	NH DOT Manual Publication, Distribution and Workshop	Road Maintenance/Urban Runoff	2001	$10,000
NH Dept. of Environmental Services	Small Education and Outreach Grants	General NPS	2002	$20,000
		Total Awards:		**$331,916**

Graphs Showing Distribution of 2002 Section 319 Grant Dollars